

Reduction of Total Ownership Costs (R-TOC)

Progress of Pilot Programs

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The Under Secretary of Defense for Acquisition, Technology and Logistics (USD(AT&L)) established the Reduction of Total Ownership Costs (R-TOC) initiative in 1999. This effort grew out of concern for the rising costs of maintaining existing equipment that resulted in the depletion of DoD's equipment modernization accounts. (Our article, "Reduction of Total Ownership Costs [R-TOC]: Recent History and Future Prospects," which appeared in the November-December 2000 issue of *Program Manager* Magazine, more fully describes these early R-TOC efforts.)

USD(AT&L) Endorses Continuation of R-TOC

Since the inception of R-TOC, the administration has changed, bringing with it a change in DoD's senior leadership. However, if anything, the case for pursuing R-TOC has become more compelling. Secretary of Defense Donald Rumsfeld, testifying on July 16, 2001, before the House Appropriations Committee on the DoD budget, stated, "The U.S. Armed Services have been under-funded over a sustained period of years." He went on

to say, "... the shortfalls are considerably worse than I had previously imagined."

As part of the effort to remedy this shortfall, USD(AT&L) Edward C. "Pete" Aldridge Jr. has endorsed continuation

of the R-TOC initiative, and has established R-TOC savings achieved by the Pilot Programs as one of the AT&L metrics.

Pilot Program Activities

The USD(AT&L) instructed the Pilot Programs to focus their R-TOC plans



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based on three large potential savings areas:

- Reduced demand from weapon systems via reliability and maintainability improvements.
- Reduced supply chain response times, leading to reduced spares, system support footprint, and depot needs.

Every ownership dollar saved can be used to provide increased warfighting capabilities for DoD. Documenting the successes these R-TOC Pilot Programs have achieved will help other programs benefit from their experiences.

- Competitive sourcing of product support, leading to streamlining and overhead reduction.

Army

Figure 1 briefly summarizes some of the initiatives/practices/techniques that the Army Pilot programs are using. As an

example of the detail that is available, the Heavy Expanded Mobility Tactical Truck (HEMTT) has three initiatives.

INITIATIVE ONE

Initiative One has two primary goals: insertion of new technologies to improve vehicle performance, and reduction of Operations and Support (O&S) costs through replacement of high failure rate items.

INITIATIVE TWO

Initiative Two, a partnership with the Defense Logistics Agency (DLA) and the prime contractor, has resulted in significant cost reductions as 90 percent of the contracted items went under Direct Vendor Delivery (DVD), with a reduced cost recovery rate. The savings for the user are realized at the battalion

level. HEMTT DVD coverage is continuing to rise throughout DLA.

INITIATIVE THREE

Initiative Three, Interactive Electronic Technical Manuals (IETMs), are on contract to provide improved maintenance capability.

Navy

Figure 2 lists some of the initiatives, practices, and techniques the Navy Pilot Programs are using to reach their R-TOC goals.

One of the Navy Pilots, the Multi-Mission Helicopter (H-60 series) program, includes three major stand-alone programs: H60B/F/H, MH-60R, and MH-60S. The H-60 R-TOC Pilot Program has used an “umbrella” strategy to meld

FIGURE 1. Army Pilot Programs—Key R-TOC Activities

Army Pilot	Approach (RM, SC, PS)	Key R-TOC Activities
Abrams Tank	RM-SC-PS	Recapitalization (through engine replacement) to improve reliability and improve O&S; public-private partnership
Apache Helicopter	RM	Major change in R-TOC approach (original primary activity—Prime Vendor Support [PVS]—dropped). Primary effort directed toward focused recapitalization
CH-47 Chinook Helicopter	RM-SC	Development of objective data system
Comanche Helicopter	RM-SC-PS	Design for reduced O&S costs; objective goals for hourly O&S operational costs
Crusader Self-Propelled Howitzer	RM-PS	Design cost trade-offs; design for reduced O&S (program undergoing major restructuring)
Fire Support C2	RM	Unified combat developer managing both acquisition and legacy requirements
Guardrail Common Sensor System (GCSS)	RM-PS	Agreements with various stakeholders on the operational performance of the system
Heavy Expanded Mobility Tactical Truck (HEMTT)	RM-SC-PS	Performance based contract partnership between DLA and Original Equipment Manufacturer (OEM)
High Mobility Artillery Rocket System (HIMARS)	RM-SC-PS	Scope of Pilot being redefined to encompass entire Multiple Launch Rocket System (MLRS) family
Integrated Target Acquisition System (ITAS)	PS	Contractor Logistics support

RM = R-TOC initiatives to improve reliability and maintainability; **SC** = R-TOC initiatives to reduce supply chain response time; **PS** = R-TOC initiatives to promote competitive product support

these three individual programs into one R-TOC plan. The H-60 approach to R-TOC consists of four pillars:

One: Implement the Navy Helicopter Master Plan, which will significantly impact the entire Navy helicopter fleet.

Two: Improve products' Reliability/Maintainability/Safety via specific product initiatives.

Three: Improve response time by a combination of near-term initiatives (e.g., DVD contracts, Reliability Centered Maintenance, Integrated Maintenance Concept) and a long-term, competitively awarded, performance-based logistics effort.

Four: Improve acquisition system efficiency by pursuit of acquisition and logistics excellence initiatives.

Air Force

Many of the Air Force R-TOC Pilot Programs (Figure 3) are using incentives to improve contractor performance. Pilot programs such as the F-117, Joint Surveillance Target Attack Radar System (JSTARS), C-17, and others are providing long-term contracting periods if the contractor performs well. This provides the contractor the opportunity and incentive to make (often substantial) investments in improvements to processes and repair and replacement parts. Moreover, O&S costs are reduced and reliability is improved with associated improvements in readiness.

The C-17 program is committed to reducing total ownership costs through a number of initiatives, including multi-year procurement, flexible sustainment, and "Must Cost" programs. The Must Cost program, of particular interest here, is a collection of contractor-funded cost-reduction initiatives. The program is seeing an approximate 2.5 return on investment for the Must Cost initiatives.

Cost Savings

The 1999 Defense Planning Guidance stated that all acquisition programs were to establish a goal of reducing fiscal 2005 O&S costs by 20 percent, while main-

FIGURE 2. Navy Pilot Programs—Key R-TOC Initiatives

Navy Pilot	Approach (RM, SC, PS)	Key R-TOC Activities
Advanced Assault Amphibious Vehicle (AAAV)	RM-SC-PS	Design for producibility
Aegis Cruiser	RM	Reduction of manpower needs through technology insertion
Aviation Support Equipment (ASE)	RM-SC-PS	Performance Based (PB) logistics support with cost-reduction/reliability improvement incentives
CVN-68 Nimitz Class Carrier	RM	Dissemination of R-TOC results; O&S cost reduction while improving Quality of Life (QOL)
Common Ship	RM-SC	Dissemination of R-TOC results; O&S cost reduction while improving QOL
EA-6B Prowler Aircraft	RM-SC-PS	Reliability centered maintenance; performance based support agreements
H-60 Multi-Mission Helicopter	RM-SC-PS	Reduction of logistics requirements by consolidating makes/models; DVD supply contract
LPD-17 Class Carrier	RM-SC-PS	Design for reduced O&S costs; Integrated Product Data Environment (IPDE)
Medium Tactical Vehicle Replacement (MTVR)	RM-PS	Non-Developmental Item (NDI) system; PB support partnership
Standoff Land Attack Missile—Expanded Response (SLAM-ER)	SC	NDI system; elimination of I-level maintenance

RM = R-TOC initiatives to improve reliability and maintainability; **SC** = R-TOC initiatives to reduce supply chain response time; **PS** = R-TOC initiatives to promote competitive product support

taining or improving readiness. Early on, it was recognized that some of the programs would have difficulty meeting this goal. The developmental Pilot Programs focus on Life Cycle Costs (LCC), and the cost data reported reflected this fact.

All of the Pilot Programs were asked to provide a baseline from which the savings were to be measured. This baseline was constructed on the basis of "what would your costs be if you continued doing business the way you have been doing business."

Figure 4 provides an average, by Service, for the estimated savings in fiscal 2005. Simply averaging the percentage savings in the Pilot Programs by Service could convey the wrong picture from the standpoint of total savings, so these data should not be used to judge the "goodness" of any Service effort. On the other hand, it is instructive to see how

the Services are tracking relative to the 20 percent goal. Using the data provided in the July 2001 quarterly reports, and assigning 0 percent savings for programs that did not provide that report, we arrive at the summary in Figure 4.

Noting that some of these numbers include life cycle savings as opposed to fiscal 2005 savings, these data point out that—over all types of programs in various acquisition stages—some will not meet the 20 percent goal. Figure 4, however, clearly reflects that the R-TOC effort does document that the Services are working toward seriously reducing costs.

In many cases, the efforts and investments made by the programs will eventually yield large savings. Often, however, this can only be demonstrated by looking at what will happen over the 20- to 30-year life cycle of the system. In a number of cases, these data reveal that changes now will reap their major

benefits beyond fiscal 2005. It simply takes time for savings to occur.

Figure 5 shows the estimated savings reported by each program that could measure savings against an accepted baseline. In some cases, the data reported are actually for life cycle savings as opposed to fiscal 2005 savings. To honor the “non-attribution agreement,” numbers are used instead of program names. The data are not grouped by Service. The goal of 20 percent in fiscal 2005 is also indicated in Figure 5.

The large spread in the data results, in part, from the mix of Pilot Programs. Fielded systems, with virtually no room for system redesigns, tend to show the lowest numbers. Note that this is not always the case, though. For the Navy’s H-60 program covered earlier, significant savings are expected because of the development of a master plan that reduces the number of various aircraft types.

In virtually every Pilot Program, additional investment in an initiative results in more combat capability for that system, as well as cost savings or cost avoidance.

An example of this is replacing a current subsystem with one that is more reliable. Repair costs go down as reliability improves, but the fact is that the warfighter has the equipment available to do the mission instead of having it down for repairs—thus resulting in more reliability and increased readiness. Further, maintenance personnel, who are often overworked, are freed-up to further improve the readiness of other systems.

Although the Services and OSD have provided new money for various programs in the name of R-TOC, the funds available have not met all of the requests. Program managers have often said that they “somehow and in some cases” were able to squeeze the funds to implement a good idea out of existing funds.

Others have provided contract incentives—like long-term partnering—as

**Life cycle savings
for the R-TOC Pilot
Programs will be
substantial. They
have proven the
potential savings
that can be
achieved ... Every
ownership dollar
saved can be used
to provide
increased
warfighting**

motivation for industry to work with the government to improve defense products.

Investment funds are needed for many R-TOC initiatives, but not always available. This fact, however, has not stopped the Pilot Programs from implementing good ideas within the existing structure.

Sharing Information

The R-TOC Pilot Programs participate in a series of Pilot Program Forums, which allow a free exchange of ideas among the Pilot Programs. The data from these Forums are generally not available, as stated previously. In some cases, though, the Services themselves provided these data and other data freely through Web-based means.

Representatives from all Pilot Programs are invited to each Forum, but only about one-fourth of the Pilot Program representatives are requested to brief at a particular Forum. Initially, representatives from the programs presented overview briefings that focused on how they were approaching the 20 percent goal. Some Forums have focused on a specific topic, which has allowed Pilot Programs to benefit from the experience of other Pilots facing similar challenges.

Specific topics of past R-TOC Forums have included: performance based logistics support, incentives, legislative/regulatory barriers, and R-TOC tools.

Senior leadership from the Services and OSD attend these Forums to provide their support and to gain a first-hand impression of the progress of the Pilot Programs. The USD -AT&L has attended in the past. Most recently, Principal Deputy Under Secretary of Defense (AT&L) Mike Wynne has attended the last two Forums to address the participants.

Lessons Learned, Best Practices

While the direct cost savings achieved by the Pilot Programs as a result of their R-TOC activities are important to DoD, this is not the only important result of the R-TOC program. An equally important purpose of the R-TOC Pilots is to attempt a wide variety of R-TOC initiatives and to document the ones that work so that they can be applied by other DoD programs. An example from each Service follows.

Army

The Abrams Tank System developed several innovative government-industry partnerships to improve R&M. The first of these is the Partnership for Reduced O&S Costs, Engine (PROSE) initiative to rebuild the existing AGT 1500 tank engine. PM Abrams, Tank-automotive and Armaments Command (Anniston Army Depot), and Honeywell have implemented this partnership in order to reduce the number of players, provide management focus, and help incorporate best commercial practices and performance specifications.

Under PROSE, Honeywell is responsible for program/project management, project engineering, customer support, supply chain management, field service engineering, and quality assurance. TACOM has responsibilities for repair overhaul, testing, failure analysis, and sustainment management.

The PROSE process is expected to improve reliability by 30 percent. The potential benefits of deploying a new en-

FIGURE 3. Air Force Pilot Programs—Key R-TOC Activities

Air Force Pilot	Approach (RM, SC PS)	Key R-TOC Activities
Air Warning and Control System (AWACS)	RM-SC-PS	Replacement of low-reliability components and subsystems
B-1B Long-Range Bomber Aircraft	RM-SC-PS	Wide range of cost-reduction initiatives
C-5 Cargo-Troop Transport Aircraft	RM-SC	Virtual prime vendor with DLA and prime contractor agreement
C-17 Cargo Aircraft	RM-SC-PS	Flexible sustainment; Performance Based (PB) support contract; Must Cost; multi-year contracting
C/KC-135 Stratotanker Aircraft	RM-SC-PS	Commercial Off-the-Shelf (COTS) electronics upgrade w/10-year warranty
Cheyenne Mountain (NORAD Combat Operations Center)	RM-PS	Total System Performance Responsibility (TSPR) contract
F-16 Tactical Fighter Aircraft	RM-SC-PS	Supplier performance agreements and cost-reduction initiatives
F-117 Stealth Fighter Aircraft	RM-SC-PS	TSPR contract w/cost-reduction incentives
Joint Surveillance Target Attack Radar System (JSTARS)	RM-PS	Contractor integration of support management; simulation model for readiness cost trade-offs
Space Based Infrared Systems (SBIRS)	RM-SC-PS	Cost As an Independent Variable (CAIV) analyses; retirement/consolidation of old systems

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gine (which is now under development) are much more dramatic—the Army could achieve a four to fivefold improvement in reliability, a 35 percent reduction in fuel consumption, a 42 percent reduction in the number of parts, and a 15-20 percent improvement in vehicle mobility. Life cycle engine O&S costs are projected to drop from \$16 billion over 30 years with the current engine, to \$3 billion with the new engine.

The Abrams Integrated Management (AIM) initiative is an innovative partnership between Anniston Army Depot and General Dynamics Land Systems (GDLS) to rebuild M1A1 tanks (the oldest Abrams models) to original factory standards, applying all Maintenance Work Orders. Although the tanks are delivered in “like new” condition, they still operate with 1980s’ technology; however, AIM also provides a cost-effective opportunity for selective up-

grades. The overhauled tanks are expected to result in an 18 percent annual O&S cost savings, while improving operational readiness.

Air Force/Navy

The Aviation Support Equipment Pilot Program developed the Consolidated Service Program (CSP), a comprehensive depot-repair agreement for Consolidated Automated Support System (CASS) station component repair. The original CSP contract was signed with Lockheed Martin Information Systems (LMIS) in April 2000. The contract is an eight-year basic agreement for LMIS to provide services to multiple agencies. The contract is renegotiated annually based on actual demand, and the program office is planning to expand this type of contract to other CASS subsystems. The CSP contract requires 24-hour support for all Broad Arrow requisitions (failures that result in equipment grounding), and

30-day turn-around time for non-Broad Arrow requisitions. The contractor holds wholesale inventory. The contract provides an incentive award fee for improved reliability.

The coverage of the CSP agreement is being expanded to include the CASS electro-optical configuration and the CASS High Power Operational Capability ancillary asset. Discussions with the U.S. Air Force are also ongoing to investigate the feasibility of implementing a similar agreement for depot repair of the U.S. Air Force and U.S. Navy Joint Service Electronic Countermeasures System Tester (JSECST) program in fiscal 2002.

Initial production of the JSECST was approved in April 2001 when it passed Milestone III. The anticipated results of these contracts include faster turn-around time for requisitions, reduced cost, on-site support availability, and improved reliability.

Air Force

The F-117 TSPR contract was designed to reduce sustainment and support cost for the F-117 fleet with no impact to the warfighter’s combat capabilities. The focus of the contract is to eliminate duplicative support infrastructures and move the non-core weapon system integrator task from the government to private industry.

The key elements of this strategy are a performance-based sustainment contract between the government and the contractor, with a contract clause incentivizing the contractor to reduce TOC. Under this approach the contractor assumes responsibilities in general administration, warehousing, spares procurement, repair decisions, and sustainment engineering tasks, while the government retains its core responsibilities.

Performance-based metrics were developed between the warfighter, the program office, and the contractor where all organizations could monitor contract performance with minimal manpower. This streamlined evaluation process al-

FIGURE 4. Estimated Fiscal 2005 Savings by Service (July 2001 Reports)

Reporting Service	Average Estimated Fiscal 2005 Savings
U.S. Army	12%
U.S. Navy	18%
U.S. Air Force	10%

lows the government to relinquish its traditional role of oversight and institutionalize a role of insight.

The TSPR contract provides incentives to reduce total ownership costs. The contract type is a Cost Plus Incentive Fee (CPIF), with an award fee feature, which allows contractors to receive an incentive fee if they meet the performance metrics and if they are on or below target cost. They also share with the government 50/50 on any cost under-run or over-run. Measurable results fit into three different categories: personnel savings, savings due to stabilized funding, and contract under-runs.

Top Five Barriers to R-TOC

DoD's new leadership asked the Pilot Programs to identify the key barriers to R-TOC implementation. Although the Pilot Programs encompass a wide variety of systems at every stage of the acquisition process, there was substantial agreement about the key barriers. The five top perceived barriers identified by the Pilot Programs are prioritized below:

One: Restrictive year/color of money requirements (e.g., annual funding, limits on appropriations categories, and reprogramming restrictions and thresholds).

Two: Inadequate processes/tools to measure savings and perform trade-offs (e.g., LCC databases and LCC analysis tools).

Three: Lack of capital funds/seed money to explore and develop R-TOC initiatives (e.g., a significant R-TOC Program Budget Decision and an OSD-controlled fund for R-TOC investments, or a Service source of funding).

Four: No guarantee that saved dollars can be used by the program that saved the dollars (i.e., an R-TOC savings reinvestment policy is needed).

Five: Limited PM control of program life cycle funding (e.g., control of O&S funds for up-front investments to decrease LCC and control of sustaining engineering funds).

All five of the top perceived barriers have been discussed at the highest leadership levels. No. 3, for example, has resulted in some additional funds being provided to the Service-selected priority programs. The problem identified in No. 1 is being addressed by Aldridge's Business Improvements Council, which recently approved a variety of legislative proposals to improve budget flexibility.

TOC Dollars Saved

While not all of the R-TOC Pilot Programs are likely to achieve the estab-

lished O&S cost savings goal for fiscal 2005, they are making important contributions to DoD. Life cycle savings for the Pilot Programs will be substantial. They have proven the potential savings that can be achieved through more effective use of trade-off models, investments in higher reliability components and subsystems, designing systems for reduced O&S costs, and improved logistics support practices, while increasing readiness.

Every ownership dollar saved can be used to provide increased warfighting capabilities for DoD. Documenting the successes these Pilot Programs have achieved will help other programs benefit from their experiences.

The Pilot Programs' successes are building an infrastructure of support for these practices within the acquisition, logistics, and warfighting communities. While investments for initiatives have been modest, the Services are increasingly supportive, and funding levels for ownership cost-reduction initiatives are increasing.

Editor's Note: The authors welcome questions or comments on this article. Contact Pallas at spiros.pallas@osd.mil; contact Novak at michael.novak@osd.mil.

FIGURE 5. Projected Savings for Pilot Programs

